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To: All DMs, DSDs, and Staff Chiefs  
From: State Director  
Subject: HYDRO Update Standards--Supplement to *HYDRO Themes and Attribute Standards* Distributed in Instruction Memorandum (IM) No. OR 98-033

The attachment to this IM provides some clarification and further discussion on information in the above IM. It is not a totally revised handbook, but a supplement to the handbook that was informally distributed in June. Please distribute to all persons associated with the workload of updating the Geographic Information System (GIS) HYDRO information.

Stewardship questions regarding these code enhancements and clarifications should be addressed to Chester Novak (e-mail *cnovak*, 503-375-5626) or Bob Ruediger (e-mail *bruedige*, (503-375-5608) of the Salem District Office. GIS-related questions may be addressed to Dan Wickwire, OR-955, (e-mail *dwickwir*, 503-952-6272).

Signed by  
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Planning, Use & Protection

Authenticated by  
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1 Attachment

1 - [July 1998 Supplement to HYDRO Themes and Attribute Standards](#) (7 pp)

Distribution

WO-230 (Room 204LS) - 1  
OR-050 (Ron Wiley, National Riparian Team) - 1  
OR-080 (Chester Novak, Bob Ruediger) - 2  
OR-931 (Karl Stein) - 1  
OR-933 (Janis VanWyhe) - 1  
OR-955 (Dan Wickwire) - 1

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## SUPPLEMENT TO *HYDRO THEMES AND ATTRIBUTE STANDARDS*

### Code Changes and Clarifications:

#### 1. STREAMS LAYER - FVdate: Field Verification Date:

This is an attribute assigned to the whole arc from node to node. It is provided for the tracking of spatially ground-truthed water body. It is not intended to indicate verification of any attribute (e.g. perennial). It is the date that the water body was actually verified to **exist** on the ground. No entry indicates that no field verification has been done. Spatial data source will indicate the method of capture (e.g. GPS).

#### 2. STREAMS LAYER - Additional Coding

Changes to coding are required for the Spatialsource, Wtrbodytype, and Hydflow fields. Changes relate primarily to pipelines and connector arcs. The table below and the following discussion provides a summary of these changes and dependencies.

Scenario	Spatialsource	Wtrbodytype	Hyd-flow	Plan-flow
Perennial streams	WOD	ST	CP	P
	DLG etc	RI	IP	
	excl DIS	SC		
Open ditches or canals	WOD	DC	DL	X
	DLG etc		DG	
	excl DIS		DI	
Natural underground streams	DIS	ST	GU	X
		RI		
Pipelines or covered conveyances	WOD	PP	PL	X
	DLG, DIS etc		PG	
	(DIS used when path unknown)		PI	
<i>Connector arc</i> from underground pipeline or covered conveyance to main stream centerline	CSC	PP	PL	X
			PG	
			PI	
<i>Connector arc</i> from open ditch or canal to main stream centerline	CSC	DC	DL	X
			DG	
			DI	

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### Assumptions:

1. It is useful to make a distinction between open ditches/canals and closed or underground conveyances (Wtrbodytype DC vs PP).
2. Closed or underground conveyances can transport water in or out of a watershed.
3. Need new Spatial Source code to differentiate secondary connector arcs (CSC) from main channel centerline arcs (CTR).

### Dependencies:

1. If *wtrbodytype* = DC, then *hydflow* = DL or DG or DI (2-way dependency)
2. If *spatialsources* = DIS, then *hydflow* = GU or PL or PG or PI **and** *planflow* = X
3. If *wtrbodytype* = PP, then *hydflow* = PL or PG or PI and *planflow* = X (2-way dependency)
4. If *planflow* = P, then *hydflow* = CP or IP
5. If *hydflow* = GU, then *spatialsources* = DIS and *planflow* = X (not vice versa)
6. If *hydflow* = CP or IP, then *planflow* = P (2-way dependency)

### Water Body Type:

DC = Ditches and Canals (also includes flumes).

PP = Pipelines and water conveyance structures (e.g., pipes) whether above or below ground (also includes siphons and penstocks). Only pipelines which are connected to a stream or lake system are intended to be included.

Note: For consistency in application, a distinction needs to be made between the DC & PP Water body Type and Streams (ST). For the Update process, Ditches and Canals (DC) are considered man-made water conveyance structures (open) constructed to transport water from a point of diversion (source of supply) to a point of distribution. The source of supply is generally a stream, river, or lake. For Update consistency, Streams (ST) are not considered to emanate from "diverted flow" nor are they constructed for purposes of use distribution. Streams which are "free flowing" but have been diked, channelized or dimensionally altered are still given a ST code. Streams which flow into a pipe and are conveyed to a water body downstream are intended to be considered as a "Pipeline" Water Body Type. The reach in which the stream flows in the pipe would be coded as PP. Trans-watershed diversions through pipelines or urban area piping would be examples. Livestock watering pipelines conveying water from wells are not intended to be captured in the hydrography theme. Road culverts are also not to be included in the PP code.

### Hyd Flow:

There are 6 codes associated with ditches, canals and piped conveyance. These are used in lieu of the codes identified under the "space" and "time" classifications.

DL or PL=

"LOSS" ditches and canals (DL) and pipelines (PL) which transport water from a contributing 5th field watershed to a receiving watershed. These structures are routing water out of the watershed in question. The contractor at the State Office **will not** populate this in the production effort.

DG or PG=

"GAIN" ditches and canals (DG) and pipelines (PG) which transport water into a receiving 5th field watershed from a contributing watershed. These structures are routing water into the watershed in question. The contractor at the State Office **will not** populate this in the production effort.

DI or PI=

"Internal" ditches, canals (DI) and pipelines (PI) which transport within the 5th field watershed but are not connected to the adjacent 5th field Water body. The contractor at the State Office **will** populate this in the production effort.

#### Spatial Data Source:

For pipelines or covered conveyances which have the PP Water body type, use the WOD or DLG code when the route is mapped. Use the DIS code when the route is not mapped.

#### 3. STREAMS LAYER - Plan Flow:

X= Streams which are not currently identified for special management under the existing planning instructions (e.g.. NWFP, ICBEMP etc). This is intended for statewide use and is largely used as a place holder associated with "GU" Hyd flow designation but can be use for those channels that are mapped as CE or CI and are not considered "intermittent" under the NWFP definitions.

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#### 4. STREAMS LAYER - Stream Name:

Clarification on rule: The centerline of a lake will receive the name of the lake that the centerline travels through if it is named. If the lake is unnamed the centerline name will be blank. The lake name on the centerline will allow the user to identify lake segments from the Stream Name field when viewing and editing.

The following naming rules are established to support the creation of local feature (streams, lakes, points) within the HYDRO themes.

1. The first position cannot be blank.
2. All letters within the name should be capitalized.
3. Do not include punctuation in the name field unless it's part of the name. Do not use periods, the underscore character, or commas.
4. Use of the apostrophe is valid for names where that is part of the name.
5. Use spaces between names and initials.
6. The Dash or Hyphen (-) is allowable but should only be used for those names where the hyphen is actually part of the name.
7. Use of parenthesis ( ) should be limited. The parenthesis should not be used unless it is actually part of the name.
8. Abbreviations: As a general rule, all words should be spelled out. The only instances where abbreviations are allowed are for long feature names that exceed the 30 character field width. In these situations, words within the name should be abbreviated beginning at the far right and moving to the left until the resulting name fits within the field. Abbreviations should be constructed by dropping vowels. Primary components of the name (e.g., Willamette) should not be abbreviated. These should be left intact and the next word to the left abbreviated.

#### 5. STREAM EDITS: Stream Order

There have been a number of questions concerning when it is appropriate to see "0" order streams in the attributes after the ordering tool is used. You can expect this to occur when:

- Ditches and Canals have been pulled out
- Side channels that have been pulled out

If neither are pulled out before the ordering tool is used they could receive erroneous orders. Either way they need to be checked during the update process.

There have also been some concerns about processing time for running the stream ordering AML. An alternative approach includes taking the coverage and breaking it into more workable components at an existing node on a stream. Preferably, split the coverage

where all the water is flowing through a single path (no side-channels, ditch/canals, etc. at or bypassing the location you choose). Run the centerline AML on the coverages, starting from the upstream portion in order to the most downstream portion. This will allow you to code the inflowing arcs of each portion with the proper stream order value of the arcs upstream.

It may also save time to remove sidechannels, etc. manually before starting the tool. This would save the time needed by the tool to recheck for cycles as you do these edits. You must remember to return these arcs to the coverage when done!

#### 6. LAKES LAYER - Water Body Type:

If there is an "expanding" shoreline (eg. annually flooded area) associated with a lake or impoundment, it is usually indicated by a polygon immediately adjacent to or surrounding the water body. This area will be coded as "LA" or "IM" or "WT" dependant on the type of standing water. The fact that this polygon is inundated will be captured under the major Attribute Classification from DLG's etc.

All tidal flats indicated in the label will receive a "ES" waterbody designation.

All submerged marshes, wetlands, bogs, sand flats (with wetland label) that are indicated in the "label" for the coastal and inland provinces will receive the "WT" waterbody type.

Districts are reminded that DLG's and DRG's are not the only source of wetland information and additional sources should be consulted and additional polygons included when deemed appropriate by district and local stewards. For example, TPCC designations of FWNW are likely candidates for inclusion in the Hyd polygon coverage as wetlands. USF&W National Wetland Inventory also provide a source to be considered by the stewards. It is appropriate to have all wetlands (deemed appropriate by district and local stewards) contained in the hyd coverage and coded as WT.

#### 7. Watershed Delineation: Coastal Areas

In "pure" 5th field watersheds the line would converge from the watershed divides to the outlet of the river or stream to the ocean. This is either the end of the jetty system or a straight line drawn between the last point evident on the left and right bank of the stream or river. On Frontal watersheds, the watershed line would be drawn along the shoreline and across the outlets of each of the contained streams in a manner as described above.

Submerged channels that are mapped along coastal areas will be terminated at the watershed boundary as described above.

#### 8. Watersheds shared with adjacent states:

We are acquiring HYDRO data from BLM California, Nevada, and Idaho for those watersheds that we share with them. We will be adding additional tiles to the district corporate libraries to complete these watersheds.

#### 9. Generated Arcs--Secondary vs Main Channel Generated Arcs:

The ARIMS project team has identified an issue that has imposed an additional requirement on the HYDRO Update effort. Currently connector arcs and centerline arcs are all given a Spatialsource value of "CTR." We now need to differentiate between these two types of generated arcs. The following schema will be followed:

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SPATIALSOURCE LPOLYLINK		COMMENTS
1. CTR	Populated	This SPATIALSOURCE code is used for generated arcs representing the main channel or generated path through the waterbody. LPOLYLINK is populated for these arcs only. Centerlines for side channels that are represented by a separate polygon on the LAKES Layer carry this code combination.
2. CSC	Not Populated	This SPATIALSOURCE code (connector secondary channel) is used for all connector arcs and secondary paths within a waterbody. LPOLYLINK is not populated for these arcs. Centerlines for side channels that are not represented by a separate polygon on the LAKES Layer carry this code combination.

This change has been implemented in the production process here at the OSO. All watersheds that have been previously completed will need to have this change implemented prior to transitioning to ARIMS. All arcs representing case #2 in the above table will need to have SPATIALSOURCE calculated to CSC and LPOLYLINK calculated to blank.

#### 10. Change to QC plots:

There was a request to add PLS to the HYDRO quality control plots. This change has been implemented.

#### Technical GIS Edit Issues:

##### 1. Intersect Errors:

Under certain circumstances, intersect errors can be introduced when a STREAMS Layer watershed is inserted back into the corporate library after check in. This is related to the fuzzy tolerance of the layer (.5 meters). Unintentional snapping of arcs can occur where

separate arcs fall within this tolerance distance. Consequently, even though the coverage may be error free at checkin, the data inserted into the library will have the intersect error problem and will need to be fixed with the next checkout. The fix for this is for the data to be edited so that arcs do not fall within this small distance. Editors need to be mindful of this situation and correct for it where encountered.

## 2. ArcEdit Tolerance Values:

There are several tolerance values which can affect the update of the HYDRO coverages. These values can be observed by running the tolerance command at the arc prompt:

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Arc: tolerance streams

We have implemented a change to these tolerance values and are enforcing this at the time of checkout and check in. Most of these tolerances can also be adjusted by the editor during the edit session(fuzzy should not be changed). The table provided below presents this information. Measures are in meters. See ARC/INFO help documentation for full description of these tolerance values.

Tolerance	Old Value	New Value	Comments
Fuzzy	0.500	0.500	Should not ever be changed.
Dangle	0.000	0.000	
Tic Match	0.000		No value set. Dependent on map scale.
Edit	1500.	200.	Large value okay. Used for locating a feature with cross hairs.
Node Snap	40.000	5.000	5m value will be enforced at checkout and checkin.
Weed	150	5.000	5m value will be enforced at checkout and checkin.
Grain	150	5.000	5m value will be enforced at checkout and checkin.
Snap	150	5.000	5m value will be enforced at checkout and checkin.
ARC Snap	default based on MBR	Off	Similar to Node Snap. Hierarchy of node snapping first, then vertex snapping, then snaps to point along arc.  Not seen using tolerance command.